APPENDIX B

QAPP GLOSSARY OF TERMS

Acceptance criteria - criteria specifying the limit above which data quality is considered satisfactory and below which it is not. [Modified from USEPA (1990b) "Acceptable quality level"].

Accuracy - the degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. EPA recommends that this term not be used and that *precision* and *bias* be used to convey the information usually associated with accuracy [USEPA (1993a)].

Assemblage - an association of interacting populations of organisms in a given waterbody, for example, fish assemblage or a benthic macroinvertebrate assemblage [Gibson (1994)].

Bias - the systematic or persistent distortion of a measurement process which deprives the result of representativeness (i.e., the expected sample measurement is different than the sample's true value.) A data quality indicator [USEPA (1993a)].

Biological Assessment / Bioassessment - an evaluation of the condition of a waterbody using biological surveys and other direct measurements of the resident biota in surface waters [Gibson (1994), USEPA (1991)].

Biological criteria / Biocriteria - numerical values or narrative expressions that describe the reference biological condition of aquatic communities inhabiting waters of a given designated aquatic life use. Biocriteria are benchmarks for water resources evaluation and management decision making [Gibson (1994)].

Biological integrity - the condition of an aquatic community inhabiting unimpaired waterbodies of a specified habitat as measured by an evaluation of multiple attributes of the aquatic biota. Three critical components of biological integrity are that the biota is (1) the product of the evolutionary process for that locality, or site, (2) inclusive of a broad range of biological and ecological characteristics such as taxonomic richness and compositions, trophic structure, and (3) is found in the biogeographic region of study [Gibson (1994)].

Biomonitoring - multiple, routine biological assessments over time using consistent sampling and analysis methods for detection of changes in biological condition.

Calibration - to determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter or other device, or the correct value

for each setting of a control knob. The levels of the calibration standards should bracket the range of planned measurements [USEPA (1990b)].

Community - any group of organisms belonging to a number of different species that co-occur in the same habitat or area; an association of interacting assemblages in a given waterbody.

Comparability - the degree to which different methods, data sets and/or decisions agree or can be represented as similar; a data quality indicator [USEPA (1990, 1993b)].

Completeness - the amount of valid data obtained compared to the planned amount, and usually expressed as a percentage; a data quality indicator [USEPA (1990b, 1993a)].

Confidence level - the probability, usually expressed as a percentage, that a confidence interval will include a specific population parameter; confidence levels usually range from 90 to 99 percent [USEPA (1990b)].

Confidence interval - an interval that has the stated probability (e.g., 95 percent) of containing the true value of a fixed (but unknown) parameter [Gibson (1994)].

Corrective action - corrective actions are measures to correct identified problems, maintain documentation of the results of the corrective process, and continue the process until each problem is eliminated. The corrective action is the process to remediate defects.

Damaged and unusable samples - are samples that have been damaged and part or all of the sample was destroyed or not recoverable.

Damaged and usable samples - samples that have been damaged but the entire sample was salvageable (i.e., *all* organisms were saved).

Data quality objectives (DQOs) - qualitative and quantitative statements developed by data users to specify the quality of data needed to support specific decisions; statements about the level of uncertainty that a decisionmaker is willing to accept in data used to support a particular decision. Complete DQOs describe the decision to be made, what data are required, why they are needed, the calculations in which they will be used; and time and resource constraints. DQOs are used to design data collection plans [Gibson (1994)].

Data reduction - the process of transforming raw data by arithmetic or statistical calculations, standard curves, concentration factors, etc., and collation into a more useful form [USEPA (1990b)].

Data validation - see validation.

Data verification - see verifiable.

Ecological integrity - the condition of an unimpaired ecosystem as measured by combined chemical, physical (including habitat), and biological attributes [Gibson (1994)].

Ecoregion - geographic regions of ecological similarity defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables [Gibson (1994)].

Endpoints - a measurable ecological characteristic [USEPA (1993a)].

Environmental monitoring - the periodic collection of data to be used to determine the condition of ecological resources [USEPA (1993a)]

In situ - used to describe measurements taken in the natural environment.

Index period - the sampling period with selection being based on temporal behavior of the indicator and the practical considerations for sampling [ITFM (1994)].

Indicator - characteristics of the environment, both *abiotic* and *biotic*, that can provide quantitative information on ecological resources [USEPA (1993a)].

Interlaboratory - activities that occur among different laboratories [USEPA (1990b)].

Intralaboratory - activities that occur within a laboratory [USEPA (1990b)].

Level of effort - the amount of effort (e.g., person-hours, sampling effort per time, or sampling vigor) needed to complete a task or project.

Measurement parameters - any quantity such as a mean or standard deviation characterizing a population. Commonly misused for "variable", "characteristic" or "property" [USEPA (1990b)].

Measurement quality objectives - the QA objectives for precision, representativeness, comparability and completeness for each measurement [this document].

Metric - a calculated term or enumeration which represents some aspect of biological assemblage structure, function or other measurable aspect of a

characteristic of the biota that changes in some predictable way with increased human influence [Gibson (1994)].

Monitoring design features - includes listing all measurements or variables to be taken; a statement of how measurements will be evaluated; the rationale used to select the statistic that will be used to analyze data; explicit delineation of ecosystems to which decisions will be applied, and a summary table listing the types and numbers of samples and the sampling gear.

Multimetric approach - is an assessment approach that uses a combination of multiple metrics to provide synthetic assessments of the status of water resources [Gibson (1994)].

Percent recovery - Accuracy is usually calculated as "percent recovery" and is applied in the form of sample sorting checks [this document].

Performance audit - a type of audit in which the quantitative data generated in a measurement system are obtained independently and compared with routinely obtained data to evaluate the proficiency of an analyst or laboratory [USEPA (1990b)].

Pilot studies - studies implemented based on questions that require field work to evaluate indicators, sampling strategy, methods and logistics [USEPA (1993a)].

Potentially Responsible Party - individual or group of individuals that may be liable for degradation of a natural resource.

Precision - the degree of variation among individual measurements of the same property, usually obtained under similar conditions; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms [USEPA (1990b)].

Preventive maintenance - an orderly program of activities designed to ensure against equipment failure [USEPA (1990b)].

Primary sample processing - the first phase of sample processing for those samples that require more than field processing, identification and counting, and, for example, laboratory subsampling of macroinvertebrate samples.

Probabilistic site - sampling sites are selected at random to ensure representativeness. Random site selection and sampling can provide a statistically-valid estimate of the condition of a waterbody class or other habitat class (e.g., lakes, large rivers, streams).

Qualitative - non-quantitative or subjective.

Quality Assurance (QA) - an integrated system of activities involving quality planning, quality control, quality assessment, quality reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence [USEPA (1990b)].

Quality objectives - the upper and lower limiting values of the data quality indicators as defined by the data user's acceptable error bounds [USEPA (1990b)].

Quality Control (QC) - the overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users. The aim is to provide quality data or results that are satisfactory, adequate, dependable, and economical [USEPA (1990b)].

Quality Assurance Project Plan (QAPP) - a formal document describing the detailed quality control procedures by which the data quality requirements defined for the data and decisions in a specific project are to be achieved [USEPA (1990b)].

Quantitative - non-subjective.

Rank order comparisons - comparing the position of a site in its assessment relative to other sites.

Rapid bioassessment protocols - a framework for assessing biological condition of streams and wadable rivers using scientifically-valid and cost-effective procedures [Plafkin et al. (1989)].

Raw data - data that have not been manipulated; the actual measurements taken.

Reference site - a specific locality on a waterbody which is minimally impaired and is representative of the expected ecological integrity of other localities on the same waterbody or nearby waterbodies [Gibson (1994)].

Reference condition - the set of selected measurements or conditions of minimally impaired waterbodies characteristic of a waterbody type in a region [Gibson (1994)].

Reference collection - a set of biological specimens, each representing some taxonomic level and not necessarily limited to specific projects or activities

Representativeness - the degree to which data accurately and precisely represent the frequency distribution of a specific variable in the population; a data quality indicator [USEPA (1990b)].

Risk assessment - Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants [USEPA (1993a)].

Sample evidence file - a file containing anything pertaining to the sample including copies or original laboratory bench sheets, field notes, chain-of-custody forms, logbooks, sample location and project information, and final report.

Secondary sample processing - the second phase of sample processing for those samples that require more than field processing, identification and counting, for example, taxonomic identification of macroinvertebrate samples.

Selection criteria - a set of statements describing suitable indicators; rationale for selecting indicators (ITFM (1994)].

Sensitivity - capability of method or instrument to discriminate between measurement responses of a variable of interest [USEPA (1990b)].

Subsampling - a subset of a sample; subsample may be taken from any laboratory or field sample [USEPA (1990b)].

System audit - consists of a review of the total data production process which includes onsite reviews of the field and laboratory operational systems and facilities for sampling and processing of samples [this document].

Tolerance values - numeric values given for biota to reflect their relative tolerance to chemical pollution or other environmental degradation. Values may be pollution specific and may be given at the family, genus and/or species level.

Type II error - (beta error) an incorrect decision resulting from acceptance of a false hypothesis (a false negative decision) [USEPA (1990b)].

Type I error - (alpha error) an incorrect decision resulting from the rejection of a true hypothesis (a false positive decision) [USEPA (1990b)].

Uncertainty of data - a measure of the total variability associated with sampling and measuring, taking into account two major error components: systematic error (bias) and random error [USEPA (1990b)].

Validation - the process of substantiating specified performance criteria [USEPA (1993b)].

Verifiable - the ability to be proven or substantiated [USEPA (1993b)].

Voucher collection - a curated collection consisting of the actual specimens collected in a survey that is maintained following identification and enumeration.